

**UNITED STATES DISTRICT COURT  
DISTRICT OF NEW JERSEY  
CAMDEN VICINAGE**

**IN RE:**  
**PAULSBORO DERAILMENT CASES**

:  
: **MASTER DOCKET**  
: **Civ. No. 13-784 (RBK-KMW)**  
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:

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<b>CYNTHIA LORD, <i>et al.</i>,</b>		: <b>CASE NO. 1:12-7747 (RBK/KMW)</b>
	Plaintiff,	:
<b>vs.</b>		:
		:
<b>CONSOLIDATED RAIL CORPORATION, <i>et</i></b>		:
<b><i>al.</i>,</b>		:
	Defendants,	:
		:
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**PLAINTIFF'S BRIEF IN OPPOSITION TO DEFENDANT'S MOTION TO  
EXCLUDE THE REPORT AND TESTIMONY OF DR. ALY COHEN**

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Filed on behalf of Plaintiff, Zena Custis

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## **INTRODUCTION**

On November 30, 2012, a train derailed while crossing the Paulsboro Moveable Bridge as a result of the tortious conduct of Defendants Consolidated Rail Corporation, Norfolk Southern Railway Company, and CSX Transportation, Inc. (collectively, “Defendants”). One of the tank cars breached, releasing well over 20,000 gallons of vinyl chloride gas into the air. The gas spread for miles.

Plaintiff Zena Custis, (“Plaintiff” or “Mrs. Custis”) was one of the many who were exposed, and she and her family suffered immediate respiratory distress. Her medical problems did not end there: Mrs. Custis continues to experience breathing difficulties and shortness of breath, body aches and joint pains, sleep problems, and emotional distress.

Mrs. Custis retained Dr. Ali Cohen as a causation expert in her suit against Defendants, and for purposes of recommending whether medical monitoring would be appropriate. Defendants have moved to exclude all testimony of Dr. Cohen, generally on the ground that she is an expert for the plaintiff and specifically based on a litany of purported defects in her methodology and analysis, all of which fall short of demonstrating that Dr. Cohen’s testimony should be removed from the province of the jury.

Because Dr. Cohen’s testimony satisfies the standards of Daubert and Fed. R. Evid. 702, Defendants’ motion to exclude must be denied.

## **BACKGROUND**

### **I. THE DERAILMENT RESULTED IN A MASSIVE EXPOSURE TO VINYL CHLORIDE.**

Raelynn Stevenson was drinking her morning cup of coffee at her home when she

witnessed the whole event occur: a train derailment at the Paulsboro Bridge, the immediate consequence of which was a vast vapor cloud. *See Exhibit A* (NTSB Interview of Raelynn Stevenson (“R. Stevenson Statement”)), p. 9:15-6. She described a subsequent vapor cloud that appeared right after the train cars derailed off of the tracks that looked like “the dust that came up the street that you saw on TV on 9/11. That’s what it looked like coming up to my house. It looked like the 9/11 dust.” *Id.* at 10:6-16.

Conrail’s dispatcher heard the Conrail engineer say “something about let’s get, you know, get us the hell out of here type thing because the vapor cloud is coming our way, and, you know, basically is, the – I guess the frantic voice that had – that he used to transmit that.” *See Exhibit B* (Deposition Transcript of Jon Havlicek (“Havlicek Dep.”)), p. 139:8-13. Conrail’s dispatcher also testified that the Conrail engineer immediately reported “[he had] a vapor trail behind [him]. Something back there [was] spewing out chemical.” *Id.* at 156:7-8.

Before the accident, the weather “was crystal clear. It was a beautiful morning.” *See Exhibit A*, NTSB Interview of Raelynn Stevenson Statement, p. 11:17-8. Raelynn Stevenson’s husband, Gary Stevenson, corroborated her story:

It became a big discussion, why are we in this cloud and that’s when it centered our discussion on Oh, it’s fog, no it’s not fog. Oh it’s part fog and part release. No, it’s all release. . . . I’m telling what my wife said that there was absolutely no fog and that it was instant fog when the train wreck happened. So it’s not like gradual fog build up, it happened instantaneously.

*See Exhibit C* (NTSB Interview of Gary Stevenson (“G. Stephenson Statement”)), p. 11:11-9 (emphasis added).

Conrail’s engineer confirmed that “as soon as the top of the bridge went down it was almost instantaneously that the fog bank came up out of the Mantua Creek.” *See Exhibit D*

(Deposition Transcript of Mark Mather (“Mather Dep.”)), p. 103:12-14. “[Y]ou could tell it was massive, it was thick, it was dense, but it just started, like, billowing and lifting, and not – as it was getting higher, it was also stretching wider and wider.” *Id.* at 104:3-6. Conrail’s engineer further described the size of the vapor cloud: “Pretty much the whole neighborhood . . . had a fog.” *Id.* at 113:19-21. He testified that he smelled a sweet odor at the site of the derailment, and also smelled that same sweet odor at the Paulsboro yard about half a mile away, less than 45 minutes after the event. *Id.* at 108; 113; 160. Conrail’s conductor also confirmed that the fog was forming rapidly and expanding out on the water. *See Exhibit E* (Deposition Transcript of Wilbert Den Ouden (“Den Ouden Dep.”)), p. 49:11-17.

The official Paulsboro police report stated: “as [Patrolman Rodney Richards] was speaking with [Conrail’s] conductor, [he] noticed a smoky fog start to swarm the immediate area and become very thick. The smoky substance that quickly surrounded [him] caused a reaction that made [him] cough several times.” In his official police report, Patrolman Richards further reported that “[t]he air became heavy and harder to breathe.” *See Exhibit F* (Paulsboro Police Report), p. 2.

A few minutes later Paulsboro Sergeant, Sgt. Gilcrest, approached Patrolman Richards, who indicated that “[he] could not see Sgt. Gilcrest until he got approximately ten feet from [him]...The smoke continued to get thicker...” *Id.* at 2. Richards also noted that Raelynn Stevenson reported to him that “she was able to see very clearly across the meadow, and no fog was present prior to the derailment, and she felt the smoke was not fog. Ptlm. Zubec stated on her way to work [that] morning no fog was present.” *Id.* at 3.

The recorded communications of the first responders further supports the immediate

presence of significant fog:

7:01 “It’s [the train] is spewing out all kinds of gas.” (Gloucester County 911 call)

7:05 “Rail cars or tank cars have been pierced and have leaked out all of their contents into the creek. The creek is full of vapors from these cars.” (Channel 3 fire Ops.)

7:06 “It’s a major emergency, bridge collapsed and major hazards, potentially life-threatening...I have an odor out here that they are not familiar with. This odor is hazardous. Hazard released.” (Zone 3 Police Radio Channel)

See **Exhibit G** (Timeline of Events and Communications on November 30, 2012).

At about 8:17 a.m. “a second wave of release [began] to submerge the area.” See Paulsboro Police Report, p. 4. Ptl. Richards noted that “this smokey fog like substance was much thicker than the first and now began to give a distinct taste in [his] mouth. Sergeant Grey was also on location who advised [Ptl. Richards that] he had the same taste[,] almost like eating a bar of soap.”<sup>1</sup> *Id.* Paulsboro Police Captain Marino, who arrived on the scene later, described the vapor cloud as “a complete white out. Alphonse [Giampola] had walked a few feet in front of [him]... and [he] could not see him.” See **Exhibit H** (Deposition Transcript of Captain Marino (“Marino Dep.”), pp. 152:23-24, 153:1-2.

The ruptured tank car contained about 25,000 gallons, or about 177,000 pounds, of vinyl chloride. The National Oceanic and Atmospheric Administration (NOAA) ran an Area Locations of Hazardous Atmospheres (“ALOHA”) model of what the exposures would be if the entire amount were released through a hole 12 inches in diameter over a time period of two minutes. This model showed that the “toxic threat zone” would extend out two miles from the

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<sup>1</sup> The police report noted that the air began to clear between 7:30 and 7:45 a.m., but a second wave of fog came through.

release area. The toxic threat zones are assessed in terms of Acute Exposure Guideline Levels

(“AEGLs”) established by the National Advisory Committee managed by the

Environmental Protection Agency.

Severity Tier	Vinyl Chloride Air Concentration (ppm)			Definition
	Exposure for 10 minutes	Exposure for 30 minutes	Exposure for 60 minutes	
AEGL-1	450	310	250	The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals... ...could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.
AEGL-2	2,800	1,600	1,200	...could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
AEGL-3	12,000	6,800	4,800	...could experience life-threatening health effects or death.

See **Exhibit I** (NJ DOH Air Quality Consultation).

The highest threat zone, corresponding to AEGL-3 at 4,800 ppm, would extend 1,383 yards, or about 0.8 mile, from the spill site; the next highest threat zone, corresponding to AEGL-2 at 1,200 ppm, would extend from 0.8 to 1.2 miles away from the spill site; and the last threat zone, corresponding to AEGL-1 at 250 ppm, would extend from 1.2 to 2.0 miles away from the spill site. See **Exhibit J** (NOAA ALOHA Model for Paulsboro, NJ). An Interagency Modeling and Atmospheric Assessment Center (“IMAAC”) model similarly estimated that the AEGL-3 zone would be about 0.5 mile in diameter and the total toxic threat zone about 1.0 mile in diameter.<sup>2</sup> See **Exhibit K** (IMAAC Model).

<sup>2</sup> A NOAA model done on November 30, 2012 estimated a red zone of only 363 yards, an orange zone of 676 yards, and a yellow zone of 1,475 yards; however, this model was based on a release of only 116,935 pounds and assumed (incorrectly) an opening only 2 inches in diameter and a release rate of only 2,330 pounds per minute for a one-hour duration.



Conrail's contractor determined that when turned to gas, the entire 80,000 kg of vinyl chloride would spread over a surface area of 30,000 meters squared and one meter thick. *See Exhibit L* (ARCADIS US's Vinyl Chloride Model). This means that an area encompassing approximately three square blocks of Paulsboro would be 100% vinyl chloride, or, in the alternative, that there would be enough vinyl chloride to contaminate an area of 300 city blocks to a level of 10,000 parts per million if equally disbursed.

## II. PAULSBORO REFINERY VINYL CHLORIDE TESTING RESULTS

Paulsboro Refinery personnel arrived at the scene of the derailment at about 8:30 a.m. with Photo Ionization Detectors ("PID"). They found that the levels of vinyl chloride in the air were so high that they were unable to "zero" out their equipment. Without being able to successfully "zero" out the PIDs first, the readings that were taken on these devices yielded results of 631, 694 and 760 ppm. As analytic chemical expert, Dr. Brian Buckley, explains, these readings need to be multiplied by 1.9 to obtain a vinyl chloride equivalent. *See Exhibit M* (Report of Brian Buckley ("Buckley Report")), p. 1.

About ten minutes later, the Paulsboro Refinery employees walked a few blocks away to Delaware Street and Billings Avenue to try to zero out their instruments, but instead obtained readings well in excess of 100 ppm. *Id.* at 2. The same meters later on had negative readings ranging from -40 to -60 ppm which is, of course, impossible. *Id.* Dr. Brian Buckley reviewed the Paulsboro Refinery data and opined that the actual vinyl chloride levels present in the air at the time the Paulsboro Refinery readings were taken were "greatly in excess of the readings recorded by the device." *Id.* at 3. Due to being unable to properly zero the device out and to the excessive saturation of the chemical, the readings from the Paulsboro Refinery PIDs could

reasonably be expected to result in substantially lower numbers than was actually present. *Id.*

### **III. NEW JERSEY DEPARTMENT OF HEALTH CONSULTATIONS**

The New Jersey Department of Health (“DOH”) performed a “Health Consultation” on air quality in Paulsboro following the derailment. The DOH reported that “there was no fog prior to the derailment, indicating that the fog formed in response to the release of vinyl chloride gas. Accounts by police responding to the scene describe the movement of the fog into and spreading through an adjacent residential area of Paulsboro.” *See* NJ DOH Air Quality Consultation, p. 2. The DOH analyzed the air modeling data that was done and concluded that “[b]ased on modeled estimates and monitoring, peak air concentrations . . . exceeded the EPA’s Acute Exposure Guidance Levels (AEGL) for one hour exposure that are associated with reversible health effects (AEGL-1: 250 ppm) and possibly disabling effects (AEGL-2: 1,200 ppm) or life threatening effects (AEGL-3: 4,800 ppm).” *Id.* at 11.

### **IV. SUBSEQUENT DETECTIONS OF VINYL CHLORIDE**

Vinyl chloride continued to be detected in Paulsboro on each day following the incident until December 6, 2012. On the night of Sunday, December 2nd, an operation was commenced to transfer the remaining vinyl chloride left in the ruptured tank car, which was estimated to be about 2–3,000 gallons. The operation was terminated early in the morning of December 3<sup>rd</sup>, and shortly thereafter, readings of vinyl chloride of 300 ppm were recorded. *See Exhibit N* (ICS Log Summary for December 2-3, 2012). The operation to transfer the remaining vinyl chloride resumed on December 5th. On December 3rd, VOC (volatile organic chemical) readings taken at the base of Washington Street near Mantua Creek were measured to be more than 147 ppm. On December 4th, those readings reached a maximum of 253.5 ppm at that same location. Also,

on December 4th, VOC readings were taken in the evacuated area of Paulsboro measuring up to 868 ppm. *See* NJ DOH Air Quality Consultation, p. 24-6.

Although it was estimated that approximately 4,000 gallons of vinyl chloride were remaining in the tank car after the initial rupture, when all the successfully transferred liquid material from the ruptured tank car was analyzed, it was found that no vinyl chloride was present. *See Exhibit O* (Unified Command Incident Summary). Conrail's contractor's analysis of the residue in the breached rail car was reported as 99% acetone and 1% water with no vinyl chloride is present. *See Exhibit P*, Bates DEFCONSOLPROD0000007754. Because there was no vinyl chloride to be accounted for, Conrail's contractor had to file a "Waste Discrepancy Report" to explain why an estimated 4,000 gallons of hazardous waste was missing. *See Exhibit Q*, Bates CSXT-Consolidated-00012328. Thus, from November 30, 2012 to December 6, 2012, 25,000 gallons of the vinyl chloride contained in Defendants' rail cars were released into Paulsboro's atmosphere.

## V. ODOR DETECTION AND THRESHOLD

There were many complaints of odor detection on the day of the chemical spill. One of the complainants was Stephanie Esposito, a Fox 29 news reporter who tweeted at 9:13 a.m. on November 30th that she "just took a walk down to the roadblock and definitely smell[ed] something sweet." She described the odor as "a pungent smell [that] hits you like a brick wall when you walk into it". She was able to smell this odor even though she had a cold. *See Exhibit R*, Screenshot of Stephanie Esposito's Twitter Feed. Ptl. Richards, who had worked in Paulsboro since 2006, testified that the odor of chemical was distinct from the typical smells in the town. He too described it as a "pungent smell". *See Exhibit S* (Deposition Transcript of

Rodney Richards (“Richards Dep.”)), p. 31-32.

Dr. Maria Kent, who is a family practitioner in Paulsboro, testified that multiple patients were concerned about their vinyl chloride exposure and reported complaints of nausea, headaches, wheezing, confusion, dizziness and dry throat. *See Exhibit T* (Deposition Transcript of Dr. Maria Kent (“Kent Dep.”)) pp. 41-43. A number of these patients also complained of smelling some kind of chemical odor that day. *Id.*

However, despite these consistent patient complaints, Dr. Kent did not believe that anyone was really smelling vinyl chloride due to the information given to her by a CTEH toxicologist contracted by Conrail. *Id.* at 47-49. This information reported that in order to detect vinyl chloride, it would have to reach a level of at least 3,000 ppm, and the highest reading at the site was only 80 ppm. *See Exhibit U* (Dr. Kent Certificate of Custodian and Corresponding Records). Dr. Kent testified that according to the CTEH toxicologist contracted by Conrail, anyone complaining of smelling odors could not possibly be smelling vinyl chloride. *See Kent Dep.*, p. 48. Contrary to the information provided by the CTEH toxicologist, more accurate and reliable readings conclusively established that the true measurements of vinyl chloride readings were well above this 3,000 ppm threshold.

The Agency for Toxic Substances and Disease Registry (“ATSDR”) also reports the odor threshold for vinyl chloride to be “about 3,000 ppm” noting that it varies significantly among individuals. *See Exhibit V* (ATSDR Report on Vinyl Chloride).<sup>3</sup> An odor threshold test performed by Union Carbide on a panel of experts with an average of ten years experience in odor detection and evaluation found that the odor threshold for vinyl chloride was commonly

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<sup>3</sup> The NJDOH Hazardous Substance Fact Sheet states “Odor threshold = > 3,000 ppm.”

2,000 ppm, although two of the most sensitive panelists could detect a faint odor at 1,200 ppm. See **Exhibit W** (Union Carbide Corporation Vinyl Chloride Odor Threshold Test).

The New Jersey Department of Health took two surveys of residents of Paulsboro following the train wreck. The first was an in person “door to door” survey and the second was a mailed survey. 50% of the adults in the in-person survey reported smelling or tasting unusual odors and in the mailed survey 69% of households reported that at least one member of the household smelled or tasted an unusual odor. See **Exhibit X** (NJ DOH Health Consultation), p. 8. Among those who reported smelling or tasting an odor in both the in-person and mailed surveys, there were higher frequencies of reported new or worsening symptoms. Also in both surveys, the most frequently reported symptoms among those who smelled an odor were headache, coughing, irritation of the nose and throat, dizziness, irritation or pain or burning of eyes, and difficulty breathing. *Id.* The DOH concluded that:

The symptoms commonly reported are consistent with what is known to occur from exposure to vinyl chloride, specifically headache, irritation of the eyes, nose, throat and lungs, coughing, nausea, and dizziness or lightheadedness. ... [T]here was a similar pattern of reported symptom frequencies between the in person and mailed surveys, as well as with the findings of surveys of emergency responders.

*Id.* at 12.

The report also found that “symptoms were most commonly reported from evacuated areas and areas within one block of evacuated areas and were least frequent in areas farther than 3,500 feet from the derailment location.” *Id.*

## **VI. VINYL CHLORIDE HEALTH INFORMATION**

The New Jersey DOH has a hazardous substance fact sheet for vinyl chloride. It states:

Vinyl chloride is a CARCINOGEN in humans. There may be no safe level of exposure to a carcinogen.

The acute health effects include the following:

1. Exposure to **Vinyl Chloride** can severely irritate and burn the skin and eyes with possible eye damage. Contact with the *liquid or gas* can cause frostbite.
2. Inhaling **Vinyl Chloride** can irritate the nose, throat and lungs causing coughing, wheezing and/or shortness of breath.
3. **Vinyl Chloride** can cause headache, nausea, vomiting, dizziness, fatigues, weakness and confusion. Higher levels can cause lightheadedness and passing out.

See **Exhibit Y**, NJ DOH Hazardous Substance Fact Sheet. OSHA's permissible exposure limit for vinyl chloride is 1 ppm averaged over an 8 hour day. The short-term exposure limit is 5 ppm, not to be exceeded during any 15-minute period. *Id.* OSHA recommends medical monitoring consisting of liver function tests, chest X-rays and lung function tests for workers exposed to 0.5 ppm of vinyl chloride. *See* Exhibit AG, OSHA Standards 1910.1017. The International Agency for Research on Cancer's (IARC) Monograph on the Evaluation of Carcinogenic Risk to Humans found sufficient evidence that vinyl chloride causes angiosarcomas of the liver and hepatocellular carcinomas (HCC). *See* **Exhibit Z** (IARC Monograph on Evaluation of Carcinogenic Risk to Humans, Volume 97 (2008)), p. 425.

The same report cited numerous studies which "found evidence of a significant association between exposure to vinyl chloride monomer (VCM) and mortality from liver cirrhosis. *Id.* at 327 (citing The European Multicentric Study); *id.* at 328 (citing Piristu, et al., 2003). Mastrangelo in 2004 also reported "an association between exposure of VCM and both liver cirrhosis and [hepatocellular carcinoma]." *Id.* at 329; *See also* *Id.* at 349 (a Cross Sectional

Study of Hepatocellular Carcinoma in Italy found an association between exposure to VCM and both liver cirrhosis and HCC in vinyl chloride workers). IARC concluded “together with the observation that vinyl chloride increases the risk for liver cirrhosis, which is a known risk factor for hepatocellular carcinoma, these findings provide convincing evidence that vinyl chloride causes hepatocellular carcinoma as well as angiosarcoma of the liver.” *Id.* at 422.

In addition, the Material Safety Data Sheet (MSDS) of Oxyvinyl issued for this very shipment of vinyl chloride risks among potential health effects states the following:

Inhalation: May cause respiratory tract irritation. Several minutes of exposure to high, but attainable concentrations (over 1,000 ppm) may cause difficulty breathing, central nervous system depression and symptoms such as: ataxia or dizziness, drowsiness or fatigue, loss of consciousness, headache, euphoria and irritability, visual or hearing disturbances, nausea, memory loss. Prolonged high concentration exposure may cause unconsciousness or death. Cardia: Acute intoxication may cause irregular heartbeats.

See **Exhibit AA**, MSDS on Vinyl Chloride (Monomer), p. 10. Mastrangelo, et al.’s 2004 study explicitly concluded that “VCM exposure appears to be an independent risk factor for [hepatocellular carcinoma] and [liver cirrhosis].” See **Exhibit AB**, Mastrangelo, et al., Increased Risk of Hepatocellular Carcinoma and Liver Cirrhosis in Vinyl Chloride Workers: Synergistic Effect of Occupational Exposure with Alcohol Intake, Vol. 112 (2004), p. 1192. Mastrangelo et al. calculated that at a level of exposure of 1,000 ppm for a time period of one year, vinyl chloride increased the risk of hepatocellular carcinoma by 1.71 and liver cirrhosis by 1.37. *Id.* at 1191.

## **VII. STATEMENT OF FACTS SPECIFIC TO PLAINTIFF ZENA CUSTIS**

On November 30, 2012, on what appeared to be a very foggy morning, Mr. Zena Custis took her son, Ja'vonn Osbourne, to school at the Billingsport Elementary School at approximately 7:00 a.m. This was the morning of the train derailment in Paulsboro, New Jersey. Mrs. Custis thereafter proceeded to the home of a close friend, Remenda Mears, located on Billings Avenue, Paulsboro, just a few houses from the railroad track and two blocks from the derailment. When no one answered the door bell, Mrs. Custis walked three houses down the street to the Heritage Food Market adjacent to the railway tracks and two blocks from the derailment location. She was oblivious to the happening of the tragic derailment, but was still aware of the fog and odd smell in the air. After making a purchase at the store, she then began walking back to Ms. Mears' home. It was then that Ms. Mears pulled up in her car and advised Mrs. Custis that a train had derailed two blocks away and all the fog and odd smells and tastes were related to an unknown chemical spill from the train derailment. Mrs. Custis was in disbelief and returned to her home on Delaware Street in Paulsboro, NJ.

Ms. Mears took it upon herself to go to Ja'vonn's school to pick him up and return him to the Custis home. Upon arriving at Mrs. Custis' home, Ms. Mears and Mrs. Custis took the child inside, but both briefly stood outside and discussed the fog and train derailment. She noticed a sweet smell in the air and had a sweet taste on her lips and in her mouth. In addition, she began to experience a headache, stomach ache and felt tired and unusually confused in her mental processing.

Shortly thereafter, Mrs. Custis and Ms. Mears went to the Paulsboro Fire Hall located on Swedesboro Road, where an emergency response team was providing information about the derailment. At the debriefing, Mrs. Custis and Ms. Mears were both advised by a person



identifying themselves as representing Conrail, that the vinyl chloride release from the derailment did not contain a sufficient amount of vinyl chloride gas to cause any serious health effects, but that they were to return home and shelter in place until further notice.

The authorities issued a general order for residents such as Mrs. Custis to stay inside her home until further notice. During the day she noticed her throat had become sore and she began to cough with phlegm production. She stayed indoors throughout the weekend while the “shelter in place” orders were in effect. However, during the period the orders were lifted, she took the opportunity to leave her home to go to work and take care of her personal obligations. Over the course of the next two weeks her symptoms lessened but she continued to have a persistent cough among other symptoms. She ingested the chemical fog for many hours in the aftermath of the train derailment. Over the months following the train derailment, Mrs. Custis experienced a persistent cough in addition to other symptoms.

Mrs. Custis has a treatment history from 2003 with a family medical practitioner named Akshay Dave, MD, (pronounced Da'vey), located in nearby Gibbstown, New Jersey. The Defendants in the above captioned matter took the deposition of Dr. Dave on June 3, 2015. During the deposition, the doctor fielded questions about his treatment of Mrs. Custis and specifically upon the numerous pages of medical records which comprised part of his medical file for Mrs. Custis.

There were twelve medical documents from Mrs. Custis medical file which were marked for identification at the deposition. Dr. Dave's office note for December 20, 2012, was marked as deposition Exhibit 9 and is attached hereafter as **Exhibit AC**. Dr. Dave reported that Mrs. Custis did not complain of any cough at that time. His notes marked as Exhibit 10 and attached hereafter as **Exhibit AD** that she did have a cough. On July, 29, 2013, Dr. Dave's office note, admitted as Exhibit 11 and attached hereafter as **Exhibit AE**, indicates that Mrs. Custis was

complaining of chest tightness resulting in deep breathing to ease the symptoms. Dr. Dave ordered a CT scan which was administered the same day. The CT scan report is attached as **Exhibit AF**, which was marked as deposition Exhibit 12. The scan revealed that Mrs. Custis had mild atelectasis seen at both lung bases. Atelectasis is a condition in which one or more areas of a persons lungs collapse or don't inflate properly. (National Heart, Lung, and Blood Institute, on-line medical dictionary).

Mrs. Custis obtained an appointment with Board Certified Rheumatologist and Internal Medicine, Dr. Aly Cohen on February 18, 2015 for an examination and medical evaluation of her symptoms from the vinyl chloride exposure on November 30, 2012. At Dr. Cohen's deposition, taken by the defendants on June 3, 2015, she advised that in addition to the medical evaluation of Mrs. Custis, Dr. Cohen reviewed Mrs. Custis' interrogatory questions and answers, the medical records of Dr. Dave, and news media films and story lines of the train derailment accident and scene in Paulsboro, New Jersey. She testified that she studied the New Jersey Department of Health reports on the subject vinyl chloride release. Dr. Cohen stated that she studied various internet sources such as PebMed for information about vinyl chloride, its properties, and its affects upon humans. She performed a MedLine search back to the 1930's where testing was done on worker's exposed to vinyl chloride. She studied the history of the chemical. She familiarized herself with the health effects of long term and short term exposures by humans. She found information about acute exposure repercussions, of long-term reactive airways from a pulmonary standpoint, and exacerbated pre-existing pulmonary diseases such as asthma, COPD, and chronic smoking. She testified that reactive airways dysfunction or RADS was seen to occur with persons having a pre-existing pulmonary condition, but also in those who

had no pre-existing pulmonary condition. Dr. Cohen reviewed the undated report of Dr. Brian Buckley. *See* Campbell Cert. Ex. J. In that report he provided a detailed analysis of the quality and reliability of VOC readings and the inaccuracy of same due to the operator's failure to properly "zero" out their equipment. By way of explanation, on the date of incident the NJ HAZMAT team initially attempted to "zero" out their equipment at the corner of Commerce and Jefferson but were completely unable to do so. Thus, according to Dr. Buckley, the readings taken at the Paulsboro Refinery are strong evidence that people were exposed to vinyl chloride levels far in excess of the OSHA limits and were likely to have been exposed to levels in excess of 1,000 ppm.

Dr. Cohen reviewed the report of Dr. Panos Georgopoulos dated March 20, 2015 wherein he developed a modeling analysis characterizing the magnitudes and spatiotemporal patterns of the airborne concentrations of vinyl chloride, and of its atmospheric degradation products, that resulted from the Conrail train derailment on the bridge over Mantua Creek in Paulsboro, New Jersey at 7:00 a.m. on November 30, 2012. *See* Def. Mot. to Preclude Exp. Georgopolous Ex. A. Cohen issued a report dated February 18, 2015 and April 10, 2015 setting forth her opinions regarding the consequences of Mrs. Custis exposure to vinyl chloride from the November 30, 2012 train derailment in Paulsboro. She stated that her belief was that the chronic dry cough as reported by Mrs. Custis was initiated by exposure to aerosolized vinyl chloride. She stated in her report that it is not clear whether or not the symptoms will continue into the future. She added that "I believe a full workup with pulmonary function testing, chest ex-ray and high-resolution CAT scan is warranted." She stated that Mrs. Custis symptoms are likely exacerbated by her current occupation as a bus driver, with chronic exposure to particulate matter, dioxin, furans,

and benzene byproducts. Dr. Cohen recommended that Mrs. Custis be monitored at six month intervals by a pulmonologist to evaluate her for any long-term sequelae from acute aerosolized vinyl chloride exposure. She concluded that if Mrs. Custis was found to have chronic asthma/reactive airway, she should be treated appropriately and followed long-term for reevaluation.

### **LEGAL ARGUMENT**

The Defendants in this case have filed a motion to exclude the expert report and testimony of Dr. Aly Cohen on their unsupported claim that the doctor's opinion fails to meet Federal Rule of Evidence 702 and the guiding principles set forth in our United States Supreme Court case of Daubert v. Merrell Dow Pharm., Inc., 509 U.S. 579 (1993).

Federal Rule of Evidence, 702 guides us on allowable use of expert testimony by litigating parties. The Rule states:

If scientific, technical or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training or education, may testify thereto in the form of an opinion or otherwise, if (1) the testimony is based upon sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods of reliability to the facts of the case.

"The Rules of Evidence embody a strong and undeniable preference for admitting any evidence which has the potential for assisting the trier of fact." Kannankeril v. Terminix Int'l Inc., 128 F.3d 802, 806 (3d Cir. 1997) (citing Holbrook v. Lykes Bros. S.S. Co., 80 F.3d 777, 780 (3d Cir. 1996)); *see also* Fed. R. Evid. 402 ("Relevant evidence is admissible."). If expert evidence is admissible, the trier of fact will determine the proper weight to give it. Maloney v. Microsoft Corp., 2011 U.S. Dist. LEXIS 127870, at \*6-7 (D.N.J. Nov. 4, 2011).

The Defendants concede that Dr. Aly Cohen is a qualified Board Certified Rheumatologist and Board Certified in Internal Medicine. Therefore, the defendants' Motion is limited to taking issue with the basis of her opinions. Thus, Dr. Cohen's proposed testimony must be evaluated for compliance with the guiding principles set forth in Daubert v. Merrell Dow Pharms., Inc. 509 U.S. 579, 592-93, 113 S.Ct. 2786, 2796 (1993). In that case, the U.S. Supreme Court held that "[f]aced with a proffer of expert scientific testimony,...the trial judge must determine at the outset...whether the expert is proposing to testify to (1) scientific knowledge that (2) will assist the trier of fact to understand or determine a fact in issue. This entails a preliminary assessment of whether the reasoning or methodology underlying the testimony is scientifically valid and of whether that reasoning or methodology can be properly applied to the facts in issue.

Ordinarily, a key question to be answered in determining whether a theory or technique is scientific knowledge that will assist the trier of fact will be whether it can be (and has been) tested. Id., at 593, 2797. Another pertinent consideration is whether the theory or technique has been subjected to peer review and publication. Id., at 594, 2797. Additionally, [the court] should consider the known or potential rate of error and the existence and maintenance of standards controlling the technique's operation.

Widespread acceptance can be an important factor in ruling particular evidence admissible, and a known technique that has been able to attract only minimal support within the community may properly be viewed with skepticism.

The Daubert Id., analysis conducted upon the testimony and report of Dr. Cohen must also be tempered by the guidance provided through the holding in Kumho Tire Co. v. Carmichael, 526 U.S. 137, 141, 119 S.Ct. 1167, 1171 (1999).

Daubert's "general holding—setting forth the trial judge's general 'gatekeeping' obligation—applies not only to testimony based on 'scientific' knowledge, but also to testimony based on 'technical' and 'other specialized' knowledge. [A] trial court *may* consider one or more of the specific factors that Daubert mentioned when doing so will help determine that testimony's reliability. But,...the test of reliability is 'flexible,' and Daubert's list of specific factors neither necessarily nor exclusively applies to all experts or in every case."

In Re Paoli R.R. Yard PCB Litig., 35 F.3d 717,747 (3d Cir.1994). "While [FRE] 702 focuses on an expert's methodology, Rule 703 focuses on the data underlying the expert's opinion. The Federal Rules of Evidence, 703 guides us on the proper basis of opinion testimony by experts. The Rule provides:

The facts or data in the particular case upon which an expert bases an opinion or inference may be those perceived by or made known to the expert at or before the hearing. If of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject, the facts or data need not be admissible in evidence in order for the opinion or inference to be admitted. Facts or data that are otherwise inadmissible shall not be disclosed to the jury by the proponent of the opinion or inference unless the court determines that their probative value in assisting the jury to evaluate the expert's opinion substantially outweighs their prejudicial effect.

The United States 5<sup>th</sup> Circuit Court of Appeals weighed in on the issue of inadmissible supporting evidence of an expert's opinion such as alleged by the defendants in their brief. In U.S. v. Dixon, 413 F.2d 520, 524-25 (5<sup>th</sup> Cir.2005). "[T]he facts upon which an expert opinion are based 'need not be admissible in evidence in order for the opinion or inference to be admitted.' The inverse of this statement, however, is not true. Where...an expert's opinion testimony is inadmissible, the hearsay upon which that opinion is based is also inadmissible.

Were it otherwise, designation as an ‘expert’ would permit any such witness—regardless of her qualification or the relevance of her testimony—to escape the ambit of the hearsay rules.” The Court went on to say, “[w]e have held that the district judge must make a factual finding as to what data experts find reliable....and that if an expert avers that his testimony is based on a type of data on which experts reasonably rely, that is generally enough to survive the Rule 703 inquiry.”

Mrs. Custis’ rheumatologist’ opinions were based in-part upon New Jersey governmental data taken from the immediate post traumatic scene of the derailment site. She reviewed the history of the chemical, the effects of the chemical and the symptoms that result. Dr. Cohen reviewed Mrs. Custis’ interrogatory questions and answers, medical records of Dr. Dave, and news media films and story lines of the train derailment accident and scene in Paulsboro, New Jersey. Dr. Cohen stated that she studied various internet sources such as PebMed for information about vinyl chloride, its properties, and affects upon humans. She performed a MedLine search back to the 1930's where testing was done on worker’s exposed to vinyl chloride. She studied the history of the chemical. She familiarized herself with the health effects of long term and short term exposures by humans. She found information about acute exposure repercussions of long-term reactive airways from a pulmonary standpoint and exacerbated pre-existing pulmonary diseases such as asthma, COPD, and chronic smoking. She testified that reactive airways dysfunction or RADS was seen to occur with persons having a pre-existing pulmonary condition, but also in those who had no pre-existing pulmonary condition. Dr. Cohen reviewed and relied upon the undated report of Dr. Brian Buckley and the report of Dr. Panos Georgopoulos dated March 20, 2015, which support the representations of Mrs. Custis

that she was exposed to vinyl chloride for a protracted period of time and thereafter developed symptoms. See Exhibit A of Defendants Motion to Preclude the Expert Report of Dr. Georgopoulos for a full copy of Dr. Georgopoulos' report.

Dr. Cohen evaluated the cause and effect consequences of Mrs. Custis' acute exposure and resulting symptoms and reasonably limited her opinions of causation by considering preexisting medical issues of Mrs. Custis such as pre-existing hypertension and pre-existing employment exposures while engaged in her occupation as a public transportation bus driver.

**I. DR. COHEN USED WELL-ESTABLISHED AND GENERALLY ACCEPTED METHODOLOGY TO OPINE ON GENERAL CAUSATION.**

Dr. Cohen's general causation methodology is not only logical but generally accepted in her field and the court system. She looked to see if there was a high exposure, and (since there was such an exposure) whether the symptoms experienced by the plaintiff began shortly after the exposure and were consistent with what would be expected to result. This was the identical methodology used by the New Jersey Department of Health in its own health consultation for Paulsboro and endorsed by Dr. Greenberg (Defendants' expert) himself.

**A. Dr. Cohen's general causation opinion survives under Kannankeril v. Terminix Int'l, 128 F.3d 802 (3d Cir. 1997).**

In Kannankeril, the plaintiff claimed she had a cognitive impairment caused by exposure to pesticides applied by Terminix. The trial court struck the experts causation testimony on grounds that there was no air-testing sufficient to support the expert's opinion about the plaintiff's exposure and that the expert's opinion on causation was unreliable and unsupported by fact (arguments made by Defendants here). The Third Circuit reversed. In discussing the exposure, the Third Circuit rejected the notion that the plaintiff's expert had to rely on ambient



air tests (which were not conducted until 9 months after the application of pesticides), and found it sufficient for the expert to look at Terminix's application records showing when, how much and where pesticide had been applied. Kannankeril, 128 F.3d at 808-809. Critical to the instant motion, the Third Circuit in Kannankeril held that "*all factual evidence* of the presence of the chemicals in the residence should be relevant in forming an expert opinion of causation." *Id.* at 809 (emphasis added). The Third Circuit's holding cements the principle that Daubert reliability determinations must be made upon consideration of the full evidentiary record, which will dictate whether or not certain exclusionary principles are apt.

In this case, although there are no precise measurements of Mrs. Custis's exposure, it is undisputed that 23,000 gallons of vinyl chloride were released into the environment and that this amount of vinyl chloride would fill up a cloud 27,000 cubic meters in size of 100% Vinyl Chloride. This is more than analogous to the "application records of how much pesticide was applied" in the Kannankeril case. If that were not enough, there is substantial evidence that Mrs. Custis had driven and walked through a vinyl chloride cloud, immediately experienced symptoms and a strange taste, and continued to experience various symptoms. Also considered by Dr. Cohen is Dr. Georgopoulos's model and the NJ DOH report, both of which document extensive levels of exposure and demonstrate that Mrs. Custis' geographic position on November 30, 2012 subjected her to those high levels. Dr. Cohen opined that: "The patient states that she developed a cough shortly after exposure to the site of the vinyl chloride spill which the patient states has lasted up to this point." "Within a reasonable degree of medical probability... I believe that her chronic dry cough was initiated by exposure to aerosolized vinyl chloride."

In Kannankeril, the expert's methodology was indistinguishable from that employed by Dr. Osinubi here: "The temporal relationship and nature of her complaints led me to conclude that with reasonable medical certainty the cause of Dr. Kannankeril's central nervous system manifestations of toxicity is exposure to Dursban." Kannankeril, Supra, 128 F.3d at 805. The Third Circuit concluded that because the plaintiff's expert had based his opinion on the plaintiff's medical records and reports of the volume of pesticide applied and his general experience, general medical knowledge, standard text books, and standard references, the experts "opinion on causation has a factual basis and supporting scientific theory."

There is a legion of case-holdings in line with Dr. Cohen's methodology – that an exposure closely followed by symptoms known to result from that exposure provides good grounds for an expert's opinion on causation. *See, e.g., Thomas v. CMI Terex Corp.*, 2009 U.S. Dist. LEXIS 86623, at \*40 (D.N.J. Sept. 21, 2009) (Simandle, J.) ("The question of causation can be resolved by a doctor without even medical testing, where the temporal proximity between an accident and the subsequent injury make the accident the most probable cause of the injury.") (and collecting cases). In Winnicki v. Bennigan's, et al., 2006 U.S. Dist. LEXIS 5568 (D.N.J. Feb. 9, 2006) (Greenaway, Jr.), for example, the court evaluated expert testimony in a case in which the plaintiff ate a Caesar salad the night before she became sick with acute gastrointestinal dysfunction, which led to kidney failure and death. Although the expert could never determine exactly what was wrong with the salad, he opined that the salad was the cause of the condition using a differential diagnosis and temporal relationship. The court denied the defendant's motion to exclude the expert, citing Third Circuit precedent (*e.g., Kannankeril*) accepting "medical testimony that relies heavily on a temporal relationship between and illness and a

causal event.” *Id.* at \*

It is contended that the scientific knowledge of Dr. Cohen as it pertains to the vinyl chloride exposure by Mrs. Custis and her symptoms will assist the trier of fact to understand or determine the causally related facts in issue. Clearly, the reasoning or methodology underlying the testimony of Dr. Cohen was scientifically based upon various accepted sources and were applied to the facts in issue as part of her report, deposition testimony and further medical records and reports as they become available. The Defendant has referenced The Bradford Hill criteria in other motions before this Honorable Court. The Bradford Hill criteria is a framework for identifying the generally accepted methodology for making determinations of medical causation. See Federal Judicial Center’s Reference Manual on Scientific Evidence, Third. (2011) at 601-06. The Bradford Hill factors were discussed in Magistrini v. One Hour Martinizing Dry Cleaning, 180 F. Supp.2d 584, 592 (D.N.J.2002). Factors to consider are whether: (1) a temporal relationship exists; (2) the association is strong or weak; (3) a dose-response relationship exists; (4) the results have been replicated; (5) the association is biologically plausible; (6) alternative explanations have been adequately considered; (7) the association exhibits specificity; and (8) the findings are consistent with other knowledge. While Dr. Cohen does not address these factors by direct reference, in her reports or deposition testimony, she certainly has addressed most of them in substance. She notes Mrs. Custis exposure location and read the plaintiff’s expert modeling studies. She was aware of the State of New Jersey monitoring information. She acknowledged Mrs. Custis potential for pre-existing causes and noted possible exacerbation of pre-existing causes. She allows for further medical evaluation and further development of symptoms.

## **CONCLUSION**

The probative value of Dr. Cohen's opinions aid the jury's ability to understand the affects of the vinyl chloride exposure by Mrs. Custis on November 30, 2012 and Mrs. Custis' resulting symptoms, and such opinions outweigh a potential for prejudicial effect.

Respectfully submitted,  
*/s/ Robert J. Campbell, Esquire*

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